



SEQUENCE LISTING

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MIZUTANI, MASAKO

<120> METHOD FOR PRODUCING YELLOW FLOWER BY CONTROLLING
FLAVONOID SYNTHETIC PATHWAY

<130> 47237.5008/00US

<140> 10/583,110

<141> 2006-06-15

<150> PCT/JP2004/019461

<151> 2004-12-17

<150> JP 2003-420046

<151> 2003-12-17

<160> 70

<170> PatentIn Ver. 3.3

<210> 1

<211> 1422

<212> DNA

<213> Artificial Sequence

<220>

<221> CDS

<222> (1)..(1371)

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<400> 1

atg gga gaa gaa tac aag aaa aca cac aca ata gtc ttt cac act tca	48
Met Gly Glu Glu Tyr Lys Lys Thr His Thr Ile Val Phe His Thr Ser	
1 5 10 15	

gaa gaa cac ctc aac tct tca ata gcc ctt gca aag ttc ata acc aaa	96
Glu Glu His Leu Asn Ser Ser Ile Ala Leu Ala Lys Phe Ile Thr Lys	
20 25 30	

cac cac tct tca atc tcc atc act atc atc agc act gcc ccc gcc gaa	144
His His Ser Ser Ile Ser Ile Thr Ile Ile Ser Thr Ala Pro Ala Glu	
35 40 45	

tct tct gaa gtg gcc aaa att att aat aat ccg tca ata act tac cgc	192
Ser Ser Glu Val Ala Lys Ile Ile Asn Asn Pro Ser Ile Thr Tyr Arg	
50 55 60	

ggc ctc acc gcg gta gcg ctc cct gaa aat ctc acc agt aac att aat	240
Gly Leu Thr Ala Val Ala Leu Pro Glu Asn Leu Thr Ser Asn Ile Asn	
65 70 75 80	

aaa aac ccc gtc gaa ctt ttc ttc gaa atc cct cgt cta caa aac gcc	288
Lys Asn Pro Val Glu Leu Phe Phe Glu Ile Pro Arg Leu Gln Asn Ala	
85 90 95	
aac ctt cga gag gct tta cta gat att tcg cga aaa tcc gat atc aaa	336
Asn Leu Arg Glu Ala Leu Leu Asp Ile Ser Arg Lys Ser Asp Ile Lys	
100 105 110	
gca tta atc atc gat ttc ttc tgc aat gcg gca ttt gaa gta tcc acc	384
Ala Leu Ile Ile Asp Phe Phe Cys Asn Ala Ala Phe Glu Val Ser Thr	
115 120 125	
agc atg aac ata ccc act tac ttc gac gtc agt ggc ggc gct ttt ctc	432
Ser Met Asn Ile Pro Thr Tyr Phe Asp Val Ser Gly Gly Ala Phe Leu	
130 135 140	
ctc tgc acg ttt ctc cac cac ccg aca cta cac caa act gtt cgt gga	480
Leu Cys Thr Phe Leu His His Pro Thr Leu His Gln Thr Val Arg Gly	
145 150 155 160	
gac att gcg gat ttg aac gat tct gtt gag atg ccc ggg ttc cca ttg	528
Asp Ile Ala Asp Leu Asn Asp Ser Val Glu Met Pro Gly Phe Pro Leu	
165 170 175	
att cac tcc tct gat tta cca atg agt ttg ttt tat cgt aag act aat	576
Ile His Ser Ser Asp Leu Pro Met Ser Leu Phe Tyr Arg Lys Thr Asn	
180 185 190	
gtt tac aaa cac ttt cta gac act tcc tta aac atg cgc aaa tcg agt	624
Val Tyr Lys His Phe Leu Asp Thr Ser Leu Asn Met Arg Lys Ser Ser	
195 200 205	
ggg ata ctc gtg aac acg ttt gtt gcg ctc gag ttt cga gct aag gaa	672
Gly Ile Leu Val Asn Thr Phe Val Ala Leu Glu Phe Arg Ala Lys Glu	
210 215 220	
gct ttg tcc aac ggt ttg tac ggt cca act ccg cct ctt tat tta ctt	720
Ala Leu Ser Asn Gly Leu Tyr Gly Pro Thr Pro Pro Leu Tyr Leu Leu	
225 230 235 240	
tca cat aca att gcc gaa ccc cac gac act aaa gtg ttg gta aac caa	768
Ser His Thr Ile Ala Glu Pro His Asp Thr Lys Val Leu Val Asn Gln	
245 250 255	
cac gaa tgc cta tca tgg ctt gat ttg cag cct agt aaa agc gtg att	816
His Glu Cys Leu Ser Trp Leu Asp Leu Gln Pro Ser Lys Ser Val Ile	
260 265 270	
ttc ctt tgt ttc gga aga aga gga gcg ttc tca gca caa cag ttg aaa	864
Phe Leu Cys Phe Gly Arg Arg Gly Ala Phe Ser Ala Gln Gln Leu Lys	
275 280 285	
gaa att gcg ata ggg ttg gag aag agt gga tgt cga ttt ctt tgg ttg	912
Glu Ile Ala Ile Gly Leu Glu Lys Ser Gly Cys Arg Phe Leu Trp Leu	
290 295 300	

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gcc cgc att tca ccg gag atg gac tta aat gcg ctt ctg ccg gag ggt 960
Ala Arg Ile Ser Pro Glu Met Asp Leu Asn Ala Leu Leu Pro Glu Gly
305 310 315 320

ttt cta tcg aga act aaa gga gta ggg ttt gtg aca aac aca tgg gtg 1008
Phe Leu Ser Arg Thr Lys Gly Val Gly Phe Val Thr Asn Thr Trp Val
325 330 335

ccg caa aaa gag gtg ttg agt cat gat gca gtg ggg ggg ttt gtg act 1056
Pro Gln Lys Glu Val Leu Ser His Asp Ala Val Gly Gly Phe Val Thr
340 345 350

cat tgc ggg tgg agt tcg gtt ctt gaa gcg ctg tcg ttc ggt gtc ccg 1104
His Cys Gly Trp Ser Ser Val Leu Glu Ala Leu Ser Phe Gly Val Pro
355 360 365

atg att ggt tgg ccg ttg tac gca gag cag agg atc aat agg gtg ttc 1152
Met Ile Gly Trp Pro Leu Tyr Ala Glu Gln Arg Ile Asn Arg Val Phe
370 375 380

atg gtg gag gaa ata aag gtg gcg ctg cca ttg gat gag gaa gat gga 1200
Met Val Glu Glu Ile Lys Val Ala Leu Pro Leu Asp Glu Glu Asp Gly
385 390 395 400

ttt gtg acg gcg atg gag ttg gag aag cgc gtc agg gag ttg atg gag 1248
Phe Val Thr Ala Met Glu Leu Glu Lys Arg Val Arg Glu Leu Met Glu
405 410 415

tcg gta aag ggg aaa gaa gtg aag cgc cgt gtg gcg gaa ttg aaa atc 1296
Ser Val Lys Gly Lys Glu Val Lys Arg Arg Val Ala Glu Leu Lys Ile
420 425 430

tct aca aag gca gcc gtg agt aaa ggt gga tcg tcc ttg gct tct ttg 1344
Ser Thr Lys Ala Ala Val Ser Lys Gly Gly Ser Ser Leu Ala Ser Leu
435 440 445

gag aag ttc atc aac tcg gtc act cgt taaagtttct tactcaatat 1391
Glu Lys Phe Ile Asn Ser Val Thr Arg
450 455

atggtacatc ggtttaacta ccaaatttta t 1422

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<210> 2

<211> 457

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
protein

<400> 2

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Met Gly Glu Glu Tyr Lys Lys Thr His Thr Ile Val Phe His Thr Ser
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Glu Glu His Leu Asn Ser Ser Ile Ala Leu Ala Lys Phe Ile Thr Lys
20 25 30

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His	His	Ser	Ser	Ile	Ser	Ile	Thr	Ile	Ile	Ser	Thr	Ala	Pro	Ala	Glu
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Ser	Ser	Glu	Val	Ala	Lys	Ile	Ile	Asn	Asn	Pro	Ser	Ile	Thr	Tyr	Arg
	50					55					60				
Gly	Leu	Thr	Ala	Val	Ala	Leu	Pro	Glu	Asn	Leu	Thr	Ser	Asn	Ile	Asn
65					70					75					80
Lys	Asn	Pro	Val	Glu	Leu	Phe	Phe	Glu	Ile	Pro	Arg	Leu	Gln	Asn	Ala
				85					90					95	
Asn	Leu	Arg	Glu	Ala	Leu	Leu	Asp	Ile	Ser	Arg	Lys	Ser	Asp	Ile	Lys
			100					105					110		
Ala	Leu	Ile	Ile	Asp	Phe	Phe	Cys	Asn	Ala	Ala	Phe	Glu	Val	Ser	Thr
		115					120					125			
Ser	Met	Asn	Ile	Pro	Thr	Tyr	Phe	Asp	Val	Ser	Gly	Gly	Ala	Phe	Leu
	130					135					140				
Leu	Cys	Thr	Phe	Leu	His	His	Pro	Thr	Leu	His	Gln	Thr	Val	Arg	Gly
145					150					155					160
Asp	Ile	Ala	Asp	Leu	Asn	Asp	Ser	Val	Glu	Met	Pro	Gly	Phe	Pro	Leu
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Ile	His	Ser	Ser	Asp	Leu	Pro	Met	Ser	Leu	Phe	Tyr	Arg	Lys	Thr	Asn
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Val	Tyr	Lys	His	Phe	Leu	Asp	Thr	Ser	Leu	Asn	Met	Arg	Lys	Ser	Ser
		195					200					205			
Gly	Ile	Leu	Val	Asn	Thr	Phe	Val	Ala	Leu	Glu	Phe	Arg	Ala	Lys	Glu
	210					215					220				
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225				230						235					240
Ser	His	Thr	Ile	Ala	Glu	Pro	His	Asp	Thr	Lys	Val	Leu	Val	Asn	Gln
				245					250					255	
His	Glu	Cys	Leu	Ser	Trp	Leu	Asp	Leu	Gln	Pro	Ser	Lys	Ser	Val	Ile
			260					265					270		
Phe	Leu	Cys	Phe	Gly	Arg	Arg	Gly	Ala	Phe	Ser	Ala	Gln	Gln	Leu	Lys
		275					280					285			
Glu	Ile	Ala	Ile	Gly	Leu	Glu	Lys	Ser	Gly	Cys	Arg	Phe	Leu	Trp	Leu
	290					295					300				
Ala	Arg	Ile	Ser	Pro	Glu	Met	Asp	Leu	Asn	Ala	Leu	Leu	Pro	Glu	Gly
305					310					315					320
Phe	Leu	Ser	Arg	Thr	Lys	Gly	Val	Gly	Phe	Val	Thr	Asn	Thr	Trp	Val
				325					330					335	

Pro Gln Lys Glu Val Leu Ser His Asp Ala Val Gly Gly Phe Val Thr
 340 345 350

His Cys Gly Trp Ser Ser Val Leu Glu Ala Leu Ser Phe Gly Val Pro
 355 360 365

Met Ile Gly Trp Pro Leu Tyr Ala Glu Gln Arg Ile Asn Arg Val Phe
 370 375 380

Met Val Glu Glu Ile Lys Val Ala Leu Pro Leu Asp Glu Glu Asp Gly
 385 390 395 400

Phe Val Thr Ala Met Glu Leu Glu Lys Arg Val Arg Glu Leu Met Glu
 405 410 415

Ser Val Lys Gly Lys Glu Val Lys Arg Arg Val Ala Glu Leu Lys Ile
 420 425 430

Ser Thr Lys Ala Ala Val Ser Lys Gly Gly Ser Ser Leu Ala Ser Leu
 435 440 445

Glu Lys Phe Ile Asn Ser Val Thr Arg
 450 455

<210> 3

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 3

gaaatggtcg gattggctgg g

21

<210> 4

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 4

acctccaccc caactttcag g

21

<210> 5

<211> 24

<212> DNA

<213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 5
 gatgcataat ttggctagaa aagc 24

 <210> 6
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 6
 ccaatttgcc aaacactttc c 21

 <210> 7
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 7
 tgcctcgaat gggtgagcac g 21

 <210> 8
 <211> 18
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 8
 ctctcactct cacacccg 18

 <210> 9
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic primer

 <400> 9
 cacgaatgct tagcatggct c 21

<210> 10
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 10
 cttattgccc actgaaaccc c 21

<210> 11
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 11
 tgtctgaatt ggcttgattc c 21

<210> 12
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 12
 aaccacaga aaccctggt c 21

<210> 13
 <211> 1446
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 nucleotide construct

<400> 13
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 gccttcgctg atccgataaa caaagctcgt gattcggggc tcgatattgg actaagcatc 180
 ctcaaattcc caccagaagg atcaggaata ccagatcaca tggtgagcct tgatctagtt 240
 actgaagatt ggctoccaaa gtttggtgag tcattagtct tattacaaga gccagttgag 300
 aagcttatcg aagaactaaa gctcgactgt ctcgtttccg acatgttctt gccttgagaca 360
 gtcgattgtg cggctaagtt cggatttccg aggttggttt tccacggaac gagcaacttt 420

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gcgttgtgtg cttcgagca aatgaagctt cacaagcctt ataagaatgt aacttctgat 480
actgagacat ttgttatacc ggatttcccg catgagctga agtttgtgag gactcaagtg 540
gctccgtttc agcttgcgga aacggagaat ggattctcaa agttgatgaa acagatgacg 600
gagtctgttg gtagaagcta cgggtgtgtg gttaacagtt tttatgagct cgagtcgact 660
tatgtggatt attacagaga ggttttgggt agaaagtctt ggaatatagg gcctctgttg 720
ttatccaaca atggcaatga ggaaaaagta caaaggggaa aggaatctgc gattggcgaa 780
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gcgaagtatt ataaggaaat ggcgagggcg gcggttgagg aaggcggttc gtcttataat 1380
ggtttgaatg agatgataga ggatttgagt gtgtaccgtg ctccagaaaa acaagactta 1440
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<210> 14

<211> 1488

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<400> 14

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acgatcatcg taacacctct taacgcgcga cgattcaatt ccgttattaa tcgagccgtt 180
gaatcaggac agtccattcg tcttctccaa gtaaaattcc ctggtgaaga agccgggttg 240
ccacctggat gcgaaagcgc cgagacttta ccattcttatg aattgattcc aaattttttt 300
accgcccgtaa aaatgtttaca acaaccaatc ccgaagaat tgagaaattt gatcccttta 360
ccaagctgcg tcatttgtga taaacacata cctggactg ctcaaacgtg caagaatctc 420
cgaattccga ggataatttt cgatggaatg agctgttttg ctcccttagt aacacacgtt 480
ctctacgtgt ctaaggttca tgaaaccgtt cctccaaacg agccgttcgt tgttctgat 540
ttccccgatg agatagagtt aacgaggttt caattgccag ggttgttgaa tccaagtcca 600
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gtggtggtga acagttttga ggagctggaa aaagattatt tcgagatgtt tcggaattg 720
aaagggggtg aagtttgggtg tgttgggcct ttgtcgcttt atggtaacga cgatttggac 780
agggtctgga gagggataaa ggcgtcgatt gatacggatc ggtgtatgaa atggcttgat 840
gatatgaaac cagaatctgt aatttatgcc tgtttgggaa gcctgagtcg tttgtcgcgt 900
tcacagttcg tcgaacttgc tttgggattg gaagcatcaa aacactcgtt tgttctagtt 960
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gaggaaagaa cgaaagatag agggttcttg attcgtggtt ggtcgccaca agtggtgatc 1080
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gagaagttag tgggtcgagat tttggggacg ggtgtgggag ttggagcgaa aagtacggta 1260
catttggggg atgaagagat ggatgagatg agagtacga ggaaggggat taccaaggcg 1320
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cttgggtgaa tggctaagag ggcagtccaa gttgggggat cttcatgtaa gaatgtcgac 1440
cagctaattc aagaagttgc accattgagt gtagcgaggg atgtgtaa 1488

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<210> 15
 <211> 1446
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide construct

<400> 15
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 cacataacct tcgtcaacac cgagtacatc cgtctccgcc tcctcaagtc ctgtggccct 180
 gccgccctgg acgggctacc ggactttcgc ttcattgacta tccccgatgg cctccctttg 240
 tcggacgacg tttcgcgtga tgtcgccttc atttctgtct ctactaacia aacttgctta 300
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 tgcattgtgt ccgacggggt aatgagtttc acccttgagg cggcggagag gtttgactg 420
 ccagaggtgc tgttctggac gcccgctgct tgtggcatct tagctttcac gcagtataag 480
 catcttggtg agagaggata tgtacctctc aaagatacga gccaggtaac aaatggctac 540
 ctggaacaaa tattagattg ggttcagggt atgaaggata ttcgattgag ggaattccca 600
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 atcaagggaa agaaaatgaa aaagaaagct atggagtggg agaggaaagc agaagaggcg 1380
 gtagcttttg ggggctcttc ctacatgaat ttggataaac ttattagcga cgtgcttttt 1440
 ccataa 1446

<210> 16
 <211> 1458
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide construct

<400> 16
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 gttcaccttg aatttatcca ccaaagtgtg tctaaagccc ataacgccac taaaactgaa 180
 gcagatttat tttcgggaagc acgagaatcc ggtctcgaca tacgttacac aacgattgac 240
 gatggtttcc ctttggaatt cgacagggtc ctccactccg aggagtattg gcactccatg 300
 ttgcgagatt tcccgttaca cgtcgtgag tttgttcgaa aagtcgtgga gtcagagcca 360
 ttttttagagc actttttggt tacggatact atgtatacat ggccgtgcaac cattgcaaag 420
 aaacataatc ttgtgaatat ttcgttttgg actgaaccag ccctgggtgtt ttctttgtct 480
 taccatataa accttctgaa gcaaaaatggt cattttccat gtaaagaaaa tattgatgag 540
 gaaataaatt acgtaccagg agttgattca ataagtacaa gggatttaat gtcttatttt 600
 aaagaacagc gatcagaaac attagagaaa aatgttgtgc tcaaggcatt tgaaggagtg 660

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aagaaagctg atttcatctt gcataacaca ttgcaagaac tagaatctga gacactctca 720
gctcttacca aaatgcagcc aaattacgcc gttggacctt ttaatttctc caaacatact 780
cctaaaactg tcaccaagag tctacggtct gaattcgact gcaccaactg gctcgactct 840
aagcctccca actctatttt atacgtctcg tttggtagtt ttattcagac aagcaaagag 900
gtaattgaag aaatcgctta cggctcttctc cttagtgaag ttaactttat atgggtggtt 960
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gcggttgag gattcttgac gcattgtgga tggaaactcg tattagagag tatgtggtgt 1140
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aatttcaata aatttattga ggatttgaag gcaaaaattc aaataatgaa agagcaaagt 1440
cctgctaata ccagttga                                     1458

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<210> 17

<211> 1443

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<400> 17

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atgggttcca cagccgaaaa taaacagaaa acccacattg tgtgcatacc ctaccagacc 60
caggggcaca tcagcccat gctaaagtta gccaaactgc tacaccaaaa cggcttttac 120
atcacttttg tcaacacgga gtacaaccac cgccgcctca tcaagtcctg cggcccacc 180
gccctcgacg gattgcccga tttccggttc gttacgatcc ccgacgggct tcttttctct 240
gaagccgacg ccacacagga tatcccttct ctttgtgttt caaccaccaa cacttgcttg 300
gagccctttt gcgagctgct gtcgaacctc aataactcgg gcccgacgt gccccgggtg 360
agctgcatcg tatccgatgg tgcgatgagc ttcacgttga aggcggcgga gagatttggg 420
ctgccggagg tgctgttctg gacgacgagt gcgtgtgggt tcttggcgta tacgcagtat 480
aagcatctcg tggagaaagg ctatgtacct ctcaaagata tgagccaagt aacggatgga 540
tatttgaaaa caagcatgga ctggattcca ggaacgaagg acatccaact aagggaattc 600
ccctctttca tcaggacaac agatccagaa gacatcatgc ttaatttttt aatacaagaa 660
actgatgttg ttccgagagc caaagctgta ataatacaaa ccttcgacat gttagaacac 720
gacgtcctgg aagcgtctct caccatgttt tcacgcgttt acagcatcgg ccctcttcag 780
ctgatgatga attatgttca caacgagtc cttaaatcca tcagttccag tctatggaaa 840
gaagaaacac attgctgcga ttggctcgat tcaaaggagc ccgaatccgt tgtgtacgta 900
aattttggca gcataactgt cgtgactgca gaacaactga ctgagtttgc gtgggggctc 960
gctaatagta agaagacttt cctatgggtt attaggcctg atatagttgc tggagactcg 1020
gctatgctgc cccctgaatt cgtgacgggg acaaaagata gaagcatgtt aatcagctgg 1080
tgtaaccaag aacaggtgtt gaatcaccca tcaattggag ggtttttgac gcacagtggg 1140
tggaattcga cgattgaaag tatagtcgag ggagttcctg tgatttgctg gcctttcttt 1200
gctgagcagc aaacaaattg taggttcagt tgcgtggaat gggaaatagg aatggagatt 1260
gataataatg tgaagagaga tgaggttgaa gttttggtga ggggaattgat ggatggagag 1320
agggggaaga aaatgaagga gaaagctatg gagtggaaag ggaaagcatt agaggcaact 1380
gcacttgggg gctcttccta cttgaacttg gaaaaactaa ttaaggaggt gcttttgcatt 1440
taa                                     1443

```

<210> 18

<211> 1407

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<400> 18

```

atggcatctt ctccccataa ccagccaacc acgccccgcc acgtggtggc cctaccctac 60
cccgcccgcg gccacataaa ccccatgctc aacatctgca aagccgtagc ggagaagagc 120
agccacatca acataacaat catcctaacc gaggaatggc tcggcttaat cggctcagcc 180
gacaagccgc cgaacataag ctacgccgcg ataccgaaca ttctgccgtc ggagcacggt 240
cgcggcgagg atccacatgg tttttgggcg gctgtttggc agaagatgga ggagccggtt 300
gatcggctgc tggacgagct tcggcttaat aataacaagc cggagtttgt gatagccgat 360
gctttcttgc attgggcggc tgacgtggcg ggcaggagga atattccctt ggcattctgtt 420
tggccaatgt cggcgtccac gttcacgggtg ctttaccact ttgaccttct cgttgaccac 480
ggacactttc cgatcgacat accagtgaat ggagatgcta ttgtggatta catcccggga 540
ctccctccag ttcgcgctcg agattttcca aaagacataa gaaaacaaga agacgcatcc 600
ttcgtcctta aactcattcc caactcacca aaattcatca tcttcacttc aatttacgac 660
ctcgaatcca agatcatcga cgctctaaag caaaaatctt ccttctcaat ctacaacatt 720
ggtcctcatg cttcctattc caaactcaaa cacatcctca actcggataa aatcacgaaa 780
cctgatcaag ataaccccgga ctacttaaaa tggttagatc tccaacctcc caactccgtc 840
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aatgaagaag agttggtggg aggagatgag attgcgaata ttgtgaggag gtttatggat 1260
atggaaaatg gtgagaggaa agagttagcg aaaaatgtga aagagggtgca gaagatttgt 1320
gcgagagagt tcgaagatgg agatggacag tcgtttgagt ttaatgttga aagtttggtt 1380
caattgattc tgcaattggg tccgtaa 1407

```

<210> 19

<211> 1428

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<400> 19

```

atgaacaaca caaccaca acaaacagta gcattagcac tagcacctca ctgtttaatc 60
gtccatttcc cattccaagg ccacattaac cccttactcc aattcgccaa acgcctcata 120
actcaccaca aaaaaaacct ccaaatacaca ttgcactca ccaaattcat cctcaccaac 180
ctctcctccg gtgccggaga atcatccttc tctctccggt caatctccga cggcttcgac 240
gccggcggcc gcgctcaggg caactccggc gccgaatacc tctccaaatt ccgcgagatc 300
ggatctcaaa ccctaaccga acttatccaa gacctatccg aatcgggtcg acccgttgac 360
tgcgtggtct acgaccggtt cgtaccttgg gccttagatg ttgccaaagg taaattcgga 420
atttcaacgg cggcggtttt tacgcagtcg tgtgcggtgg ataatatata cagtcgggtt 480
tataacggcg atttgagct gccgttgccg gagaatgagg tggttagggg tccgggtttg 540
ccggagatgg agccgtttga gatgccgagc tttgtgtatt taaacgggtc gtaccgctcg 600
agttttgaga tggttgtggg tcagttagg aatgttgatg aggcggattg ggtttttgtc 660
aacacttttt atgagttgga gaaagaggtc attgactgga tgtcaaaatc ttggcgagtg 720
aaagcaattg gacctaccat accatcaatg ttcatggaca agagattgca agaggacaaa 780
tcatacggtc ttagcatgtt caagcataca acaaatgact gcataaattg gctcaacgga 840
aaacaatcaa aatccgtcat ttatgtcgca ttggaagtc ttgcagaatt atcccacgac 900
caactcaag aactggcaca cgcttaaca acctacgaca aacacttctt atgggttgta 960
cgatcatcgg aagaagctaa gcttcccaa aattttgcta acgaaacatc taagaaaggg 1020

```

```

ttgatagtgt cgtggtgccc tcaattagag gtcttgtcgc acgaggccat cggttggttc 1080
gtgactcatt gtggttgga ttcaacgctc gagggattga gtttgggggt gcctatggtg 1140
gcgatgccac agtggacgga tcagagtacg aacgctaagt ttatcgtgga tgtttgggggt 1200
gtgggtgttc gggctaagggt ggacgagggg ggattagcga ggcaagatga gatagtctgt 1260
tgcttaggga gcgtcatgga aggggagaac ggagaaaaga taagaaagaa tgcgaatgaa 1320
tggaaggaac gggcgtgcaa tgcagttgat gaagggggga gttcagacaa aaatattgaa 1380
gaatttgtaa ctacgttgat aagttcccat gacttgcgtc aagagtaa 1428

```

<210> 20

<211> 1425

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<220>

<221> modified_base

<222> (1349)

<223> a, t, c, g, unknown or other

<400> 20

```

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gtctcaacgc tagagacggc aaagctactc gtcgatcgaa acaaacgcct caccatcaca 120
atcctcctca tgaagctgcc agtcgacgcc aaggtagatg attccttcac aaaaaatccc 180
tctgtctctc aaataacttt tgtacatctc cctcgaatcg agcacagttc catggaacca 240
ccgggaactc ccgaatcctt tgtacacagg ttcgtcgaga gccaaaaatg tctcgtaaga 300
gatgcggtgg ttaaagcaac ggagggctca aaatcaaaca ggctagccgg atttgtaatc 360
gacatgttct gcaccccgat gattgatgtg gccaatgaat ttggcgtccc gacatacgtg 420
gctttcacgt ccggggccgc aactctcggg ctattgttcc atttgcagag tcttagagat 480
gaatttaatc aggacgtgaa ggagtacgag aactcggaag ttgagatata gatcccggct 540
tatgttaacc cgttcccttc caaatccttg ccgtctcctg tottcaacga ggacggtgtt 600
tttcttagtc ttgcaaagggt gttcagagag gctaaaggta tattgatcaa caccttttta 660
gaatttgaat cccatgccat taaatcgctc tccaacgatg cgagaatccc gcctgtttac 720
ccatcgggc cagtaattca cgccacggaa gataatgcaa acaaaggaaa gcaggacgaa 780
atcatcgctt ggcttgacga gcaacctgat tcatccgtcg tgtttctttg cttcggaagc 840
gctggatgct ttgaagaaaa tcaagtgaag gagattgcag tggcgctcga caaaagtgga 900
taccggtttt tatggtcatt gagaaagccg cctcccaaag aaaaagcgga gtttccaggg 960
gagtacaaag attttaatat agttttacca gaagggttct tacaacgtac gtccgggaga 1020
ggtaaggtaa taggatgggc tccgcagatg gccgtgttgt ctcaaatgc ggtgggagga 1080
ttcgtgtcgc attgcggtct gaactcgacg ttggagagtg tttggtgcgg agtgccaatg 1140
gccgtgtggc cattggcggc cgagcaacat gcgaacgcgt tccagttggt gaaggagtgt 1200
ggaattgcgg tggagattaa gatggattat aggaagaaca gtggtgtgat tgtggaggca 1260
aaaatgattg agaaaggaat cagggagtgt atggaccgg aaaatgagat aaggggtaat 1320
gtgaaaagtga tgaaaaagga gagtaggana gctgtcgtgg atggtgggac ttcttttgat 1380
tacttgatc gttttgttga aactgtcgtg aataatgttt tgtga 1425

```

<210> 21

<211> 1446

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<400> 21

```

atggggttccg tagccggaaa cagttacaaa cggcctcatg ctgtgtgcat acccttcccg 60
gcgcaggggc acatcaaccc catgctgaag ttggccaaac tcctccacca aaagggcttc 120
cacatcacat tcgtcaacac agagtacaac caccgcccgt tgctcaagtc cctcgcccc 180
gacgctctcg atggcttgcc ggatttccga ttcgcaacca tccccgacgg tcttctctcg 240
tctgacgcgg acgtcactca ggatgttcct tctctttgta tgtccaccac taacacttgc 300
ttggagccct ttaccgagtt gctgttgaaa ctcaataact ccggcccga cgtgccaccg 360
gtgacctgca tcgtctcgga tgggtgcatg agcttcacat tgaaggcggc ggagaggttt 420
gcgctgccgg aagtgtgtgt ctggacgacg agtgcggtgt gtttcttggc gtacacgcag 480
tataagcgtc tcttgagaaa aggctatgtc cctctcaaag atatgagcca gttaacaaat 540
agctatctgg aaacaaccct cgactgggtt ccaggaatga aggatatccg attaagggac 600
ttcccatcat tcacagggac aacggatcca aaagacatca tgtacaattt cgtattacaa 660
gaaaccgacg ctgtctccag agccaaagct ctgatcatca acacctttca tacattggaa 720
cacgacgttg taaatgccct ctccaccatg tttccacgtg tttacaccat cggctctctt 780
cagctgatgt tggaccaagt tcatgacaag agccttaacg ccatcaactc caatctctgg 840
aaagaagaat cgcaatgcat cgattggctc aattcaaaaag agcccgaatc cgttgtgtat 900
gtgaatttcc gtagtgtcac tgttgtagct gctcaacaac tgacggaatt tgcgtggggg 960
cttgcaaca gcaacaagac ttttttatgg gttattaggg ctgatatagt tgttgagagc 1020
tcggcaatgc tgccccctga attcttgacg gacacggaag acagaagcat gctaataagc 1080
tgggtgaacc aagaacaggt gttgaggcac ccttccatcc gaggattttt gacgcacagt 1140
ggttggaact cgacgcttga aagtattgtc agcggagtgc ctatgatatg ttggcctttc 1200
tttgctgagc aacagacaaa ttgtaggttc agttgcgtgg aatgggaaat aggaatggag 1260
attgacaata atgtgaagag agatgaggtt gaggtgctgg tgagagagtt gatggatgg 1320
gaaaagggga agaaaatgaa gaagaaagct atggagtggg agatgaaagc agaagcagca 1380
gctgcccctg ggggaccttc gtctttaaat ttggaaaaac ttattgagga ggtgcttttg 1440
caataa
1446

```

<210> 22

<211> 1308

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<400> 22

```

atgaaggctc atgcagtgat gcttccttgc cccgtacaag ggcacttaaa tcctatgctg 60
aaactggcca aaatatgtga ttcaagaggc ttcttcatca cattcgtgaa cacggaattc 120
aatcacaatc gtctagtgcg tgcgagaggc cccgaatctg ttaaaggctc cgatgatttt 180
cagttcaaaa ccatacctga tggactaccg cctttttgata aggacgcaac gcaagacata 240
cctcaactgt gtgattctct tcaaaaagaat ggtcttctct cattgttgga cctcattaaa 300
agtattaatg attcacccga ctgtccaaat gttacctgta tagtgattga tttggccatg 360
agtttcgctc ttgatgcggc cgagggtgtc aaaattccca cgggtgactt ttcgccaact 420
agtgtttgtg gattcatggg gttttgcaat tatgaagagc ttgtgaatcg aggattgttt 480
ccacttaaaag atgaaagtca aataactaat ggctatcttg ataccaaaact agactgggtg 540
ccagggatga agaacattag gctcagagat tttcctagtt tcatccgaac gactgatcca 600
gatgatatac tgggtgaactt catgattttt aacatgaaga atgcgcctcg tgcaaaggct 660
gtggtagtca acacattcga tgaattggag aaagatgtat tggaggccct aagtaaaaaa 720
tttgatcatg ttttttccat aggccactc caattgatgg agaaggcttt ccaaaagcct 780
gaggtaaaaat ctataggatc aagcttgtgg aaagaagaca acacgtgcat cgcttggtc 840
aacggcaggg agccaaattc tgtgtgtgac gtgaactttg gaagcatcac agtggtgtca 900
cctcaacaac tattggagtt cgcatggggc ctagccaata gcaaccatta ctttttggg 960
atcataaggc cagatttggt aagtggagaa tctgcgattt tatccgaaga gtactcaaa 1020
gaagttgaag ggcgggcgat gatggtgcgt tggctgtctc aagagcaagt attggccat 1080
ccttcggtag gtggattctt gacacattct ggctggaact cgactatcga aggaatgtca 1140

```

```

gaaggtgttc ctatgatttg ttggcctttt tttgctgacc aacagaccaa ttgtcgggtat 1200
gcatgcacgg agtgggagat tggaatggag attgaaggag aggttacgag ggataaagtg 1260
gcggatttgg tgaaaatatt gatggaggag ggaaggggag agcgatga 1308

```

<210> 23

<211> 1506

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<400> 23

```

atggccattc atgaacaaaa acctcacttt gtcctgttcc ctttcatggc acaaggccat 60
atgattocca tggtagatat cgccagatta ctgcggaagc gcggtgtcac aatcaccatt 120
ctactcacac ccacaaatgc caacagggtc aaaacagtca ttgctcgtgc aatcgattca 180
ggactaaata tcaatgtcat ccacttcaaa tttccatccg ttgaggtcgg attgcccgaa 240
ggttgtgaga atttcgatat gtcacctgac atcaatggcg cattgcagtt tttcaaagcc 300
actttcatgt tacaagaaca ggtcgaagag ttgcttccaa agctcgagcc tcttccgagc 360
tgcctaattg ctgatatgtg ctttccatgg acaacaaatc ttgctttgaa gttaaattgt 420
ccaagaattg tgtttcacgg gacaagttgc ttttctctcc tatgtatgca cgtttttagga 480
acttctaagg atttcgaagg tgtgactaac gaaacggagt acttccttgt gcctggatta 540
ccagataaaa tcgaaataac caaaattcag cttaggggca cccttattca aatgaattca 600
gactggacga agtttcgtga tgaggtgcga gaggctgagg taaaagcatt tggaacgggtg 660
gccaatactt ttgaagattt ggaaccagag tatgtcaaag aatacagcag agttaaaggc 720
aaaaaagtc tggcatagg tctgttttca ttatgcaaca aagatggcat agacaaggcc 780
gaaagaggta acatggcttc aatcgacgca caccatttgt tgaagtggct caattcacac 840
gaacaaaagt ctgttattta cgtctgcctt ggaagcatat ctgcctcgc tacttcacaa 900
ctgatagagc ttggattggc tttagaagca tcaaacagac cttttatttg ggtagttaga 960
gatccatcac aagaacttaa aaaatggttt ttgaatgaga aatttgagga aagggtaaaag 1020
gatagaggcc ttttgatcaa cggttgggcg cctcaagtgc tcatactttc ccatccatct 1080
gttgaggagg ttgtaacgca ctgcggctgg aactcgatgc ttgaaggggt tacttcaggc 1140
ttgccgatga taacgtggcc tgtatttgct gagcagtttt gtaatgaaaa gtttatttgt 1200
cacgtgatca agactgggat aagagtgggt gttgaagtgc ctatcatctt tggagatgaa 1260
gaaaagtcg gagttttgt gaagaatgat gagataaaga tggttataga taagttgatg 1320
gatggaggag aagaggggag agagagaaga gagagagctc aaaagcttgg agaaatggca 1380
aaaaaggcaa tggaggaggg tggttcttct tatcataatt tgacatcggt catgcaagat 1440
gtcatgatgc aacaagctaa taatggagat caatatgaag atggtgttac agttataaat 1500
acatga 1506

```

<210> 24

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
primer

<400> 24

gggggatcca tggctagtga gagccaaata

30

<210> 25
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 25
 cccctcgagg gtacctcaca aaacattatt cacgac 36

<210> 26
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 26
 atgggagaag aatacaagaa aaca 24

<210> 27
 <211> 26
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 27
 taaaatttgg tagttaaacc gatgta 26

<210> 28
 <211> 1386
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide construct

<400> 28
 atgctgagcc tcgccaaaat tctgcaccaa aagggtattcc atatcacttt cgtaaact 60
 gaatttaacc atgaacgcct cctgagaacg agaggcccga attcccttga cgggttgcc 120
 tcgtttcgat tcgagacaat tcccgacggt cttccgccat cagaccccga tgctacacaa 180
 aacgttgcat tattgtttga gtccagcaca tccaaatgct tagctccatt caggacatt 240
 cttgctaagc taaaccacac cgacgtgccg ccagttactt gcatactatc cgacttaatc 300
 atgagcttca ctcttgaagc tgctcaagag ctcagcatcc ctgatgtcct tttttggacc 360
 gctagcgctt gtggatacct cgcttatgca cactatgcca cgcttattga aaaaggattt 420
 acacctttca aagatacgag ttgcttgacc aatgggtatt tggataccgt tattgatgat 480
 attcctagtc tggaaggcat acgtctgaga gacattccaa gttttatcag aacaactaat 540

```

ccagatgaca ttttgatgaa ctttgtgttg cgagaaacag agagagctag aaaagggttcc 600
gccgtaatct ttaacacggt cgagtgcctc gaggttgaag cattaaacgt acttttcatcc 660
atgttgccctc cagtttacac agttggaccc ctgcattttg ttgaaaagca tggttggtcac 720
aaaggattgg aggtgcttgg atcaaattta tggaaagaag agccaaaatg tctcgaatgg 780
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tggtattataa gacctgacct tgtctcaggg gaaaacgctg ttcttccacc cgaatttctc 960
gaagccacaa aagaaagagg gtgttttagca aattgggtgcc ctcaagagaa agttcttagc 1020
caccatcca tcagaggatt cttaactcac agcggatgga attcaactct tgagagcatt 1080
tgcagtggag ttccaatgat cagttggccg ttcttcgccc aacaacagac taactgttgg 1140
ttttgctgca caaaatgggg cataggcata gagctagaca atgatgtcaa aagggataaa 1200
gtggaagacc ttgtgcgcga attgatgtct ggggataaag ggaaagagat tatgaaaatg 1260
gctatggagt ggaagaagct ggccgaagag tctgcccaga gtcatcttt taagaatcta 1320
gagaaagtga ttcattgaagt gcttttacca ccactacaag tgtgggatcc taaggattcc 1380
acctaa 1386

```

<210> 29

<211> 1374

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<400> 29

```

atggaggaca ctatcggttct ctacgcttca gcagagcacc ttaactccat gctactactc 60
ggcaaaactca tcaacaaaca ccaccccaca atctccgtcg ccattatcag caccgcccc 120
aacgcgcgcg ctagttccgt cgccgacgtg gcggccatat cttatcagca actcaaaccg 180
gccactctcc cttcggatct aacaaaaaac ccaatcgagc tcttcttcga aatcccacgt 240
ctacataatc ctaacttgct cgaagcgctg gaagaactgt cactaaaatc aaaagtaagg 300
gcatttgtga tagatttctt ttgcaatccc gcatttgagg ttctgactag cttgaacata 360
cccacttact totatgtcag cagcggcgcg tttgggctat gcgggttctt gcattttccg 420
acaatcgacg aaactgtcga aaaagacatc ggtgaactga acgatatctt ggagatccc 480
ggttgcccc cggttttgtc ctccgatttt ccgaaaggta tggtctttcg caagagtaac 540
acttacaagc attttttaga cacggcgaaa aacatgagga gagcgaaagg gatcgtggtg 600
aacgccttcg acgcgatgga gttccgagct aaagaagccc tcgtcaacaa tctgtgcgta 660
cccaattcgc caactcccc agttttctta gtcggcccat tggtcggagc aagcacaact 720
acgaaaacca caaacgaaca gcacgaatgc ttgaaatggc tggacgtgca gccagacaga 780
agcgtgatct tcttatgttt cggtaggagg ggtttgttct ccgcagacca attgaaggaa 840
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agtaagccta actcttataa cactgatccg gacctggacg agctcctgcc cgaggggttt 960
ttgtccagga ccgagacccg gggtttctgt atcaagtctg gggcgccctc gaaggaggtg 1020
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gcggtgtcgt ttgggggtgc gatgatcggg tggccgatat acgcggagca gaggatgaat 1140
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ttcgtggcgc cggtggaatt ggagaagaga gtgaaggagt tgatggattc gaagaatggg 1260
agagcggtta ggcagagagt gaaggagatg aaagtggcgg ctgaggtggc ggttgaaaag 1320
ggtggttcgt cagttgtggc gttgcaacgc tttgttgata tgggtggttc ttaa 1374

```

<210> 30

<211> 1362

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<400> 30

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atggaggcag acaaagaaaa tctcaagatt ttaatgttcc catggttggc tcatggtcat 60
atattttccat ttcttgagct agccaaaaga atcttgaagc gaaaaaactg gcacatatat 120
ttgtgtacca cagccataaa cttcagttct atcaacaact tcattgaaaa atataagttg 180
gagaactcaa tagaagtagt agaactccat atagaaccat cccctgaact tccacctcat 240
taccacacta caaagaattt gccacaagt ctcaattcta ccctattaaa ggccattcag 300
acgtcgaaat cgagcttctc agacatcatc agaacattga aacctgaact agtgatatat 360
gatgtgtttc aaccttgggc tgccaagatt gcttctctac aaggatttcc tgctgtttat 420
ttttctagct ttggaggggc accattatca cttatgcac atcaccacac gtacggaaaa 480
cccgaatttc ccttccaagc aatagttgtt gaggacatcg aactggaaa tttgctctct 540
ttgtttgatt tcttgtatgc caacatattt gaagtggatc aagattatct ttttgggaat 600
ttcaagcaat cttgtgagct tgttttgta aagagtagta aagggttga gaggaagtac 660
atcgattatc tttcatcttt gtctcagaaa aaaatattac ctgttggacc actagtcaca 720
gttgacaata agaccaatga ggagaattcc gagatcatga attggttgag caagaaaaaa 780
caccattcaa ctgtctacat ttccttcggt agtgaatact tcctgtctaa agaagagatt 840
gaagagatag caaaagggtc tgagctttgt gatgttaact ttatatggat catcagattt 900
ccagttggag tgaccgttaa cttagaagaa acactgcctc aaggtttcct tcaaagggtg 960
aacgaacggg ggatggttgt ttcaggatgg gcaccacaga gcaacatatt agcacatcca 1020
agcacaggag gctttgtgag tcaactgtgg tggagttcta tcacagaaag cgtatatattt 1080
ggtgttcogg tcatagggat ggcaatgaaa cttgatcagc caataaacgc cagaatgtta 1140
tcagaggctg gtagtttgtt cgaagtcaaa agatatgaaa atgaagtgtt taggggagaa 1200
gagatagcga aggcgataaa gaaggtgatt gttgaggaca gtggagaaa gctgcggcaa 1260
agagctttag aattgagcga gaagatgaaa atggaagagg aaaatgagat ggatgaagta 1320
actgagcagc tgtgggagct ttgcttgacg aaaaaacggt aa 1362

```

<210> 31

<211> 1437

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

<400> 31

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atggaacctc atatagttat attcccgttc atgtccaaag gccacacaat ccctctcctc 60
cacctctccc acctcctcct tagtcgcgga gtacgcgtaa cgatcttcac cactgcacaa 120
aaccaccctt tcatcgctca acatgtccca aaaacaaata atgttaccat cattgaccta 180
ccgttccctg ataacatccc tggaatttca ccaggaacgg agagcacgga caaactcccg 240
tcgatgtctc tcttcgtccc gttcgtgaac gccgctaaat cgatgcaacc gttcttcgaa 300
gatgagcttg agaaaattca ttcagggggt agttgtgtta tatcggtgg ttttcttcat 360
tggacgctga aatcagcatc caagtccgga attccacgac tgagtttcta cggtatgagc 420
tactatgcct tgacaatttt tcgagtcgct atctcaaaca agttaatatc attgcacgag 480
tcaccgcacg aggcatcac cttacctagt tttccttggg ttaaactcac tagagatcac 540
ttcgacaaac cacttgatca acgtgaacca aatgggtccg aatttgactt tttcatggaa 600
gcaacgacag ctactgtgaa tagctatggt ttcttagtga atagcttcta tgagcttgaa 660
ccaactttcg cggattacta tgacaacaat tacaaacca aggcgtggag tgtcgggcct 720
ctctgcctcg cacaaacgcc aaagaatgat aatctctcgt cgaagcctga gtggattcat 780
tggttgacc aaaagttgga acaagatcgc cctgttttgt acattgcatt cggtacacaa 840
gcagaaaatta cactagaaca gttacatgaa atctcacgag ggttggaaga gtcaaagtga 900
cactttttgt gggttttaag gaacaatgga gttgaactaa gtgatggatt tgaagacagg 960
gttaagaata gaggaattgt agtaaaagaa tgggttgatc aaagagagat tcttgaacat 1020
gaaagtgtaa aaggctttct aagtcattgc ggctggaatt cggtaatgga aggtatatgt 1080

```

```

gctggaggttc tgattcttgc gtggccaatg atagcggagc aacacttgaa tgcaaagatg 1140
gtgagtgaag aaataaagat tggtttgaga gttgaaacgg ttgatggaac ggcaaagggg 1200
tttgtgactg cggcgagttt gacgaaggcg gtgatggaat tgatggaggg tgagaagggg 1260
aaggaattga gggagaatgt gaagaaagtg gctggggcag cgaggggaagc ggtggtggaa 1320
ggtggttcgt cgtggaatgg tttgaatgaa ctcatgatg aggtgtgtag gcataaggaa 1380
atgagtggta gttctaaagt tgatgaaaac aagagggaaa ttaaggatat taattaa 1437

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<210> 32
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 32
 cccatgggag aagaatacaa gaaa 24

<210> 33
 <211> 26
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 33
 ggtacctata aaatttggtg gttaaa 26

<210> 34
 <211> 1080
 <212> DNA
 <213> Homo sapiens

<400> 34
 caccgattac atgacgtaca tgttcaagta cgacagtgtt catggtcagt ggaaacacca 60
 cgagttgaag gtacaggatg agaagaccct tctgtttggt gaaaagccag taagagtctt 120
 gtcaactggt gtcttcacgg acaaagataa ggctgctgct cacttgaagg gtggtgccaa 180
 gaaggttgtg atctcagcac caagcaaaga tgcaccaatg tttgttgtgg gtgtcaatga 240
 gaaggaatac aaaccagagt tggacattgt ttccaatgct agttgcacta ccaattgcct 300
 tgcccccttt gccaaaggtca ttaatgatag atttgggaatt gttgagggcc tcatgaccac 360
 cgtccactct attaccgcaa ctcaaaaagac tgtcgatggg ccatcgagca aggactggag 420
 aggtggaaga gctgcacgt tcaacattat cccagcagc actggtgcag ctaaggctgt 480
 tggtaaagtg ctcccagttc tcaatggaaa gctaacggga atggccttcc gtgttcctac 540
 tgtcgatgtc tccgtagtgg acctcactgt caggctcgag aaagaggcca cttatgatga 600
 gatcaaagct gctatcaagg aggaatccga gggcaacctt aagggcattt tgggctatac 660
 cgaagatgat gtggtgtcaa cagactttgt tgggtgatagc cgatcaagca ttttcgatgc 720
 caaggctgga attgcattga gcaagacgtt tgtgaagctt gtgtcgtggt acgacaacga 780
 atgggggttac agttcccgtg tgatcgacct gatcgtgcac atggcctcag tttctaaggc 840
 ttgatcgatg atctgcttag gccgtgaagc agctttttgtc ttatcgcatc ttttctgagt 900
 ttgtaataat gggcttttgt gttatttgca gcctaatttt gcagtttgca aatttatggt 960
 ttttggttat gttttgctga aacctatttt attacccttt cgcgttgggt tattgaatgt 1020
 gaactctttt tactgatgtg tttaacgttc tctcttttaa aaaaaaaaaa aaaaaaaaaa 1080

<210> 35
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 35
 tggtgctggt aacgatccat

20

<210> 36
 <211> 18
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 36
 agctcttcca cctctcca

18

<210> 37
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 37
 atgttcaaaa atoctaatat ccgc

24

<210> 38
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 38
 ttagccatca agtcaatct tgaca

25

<210> 39
 <211> 16
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 39

aacagctatg accatg

16

<210> 40

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 40

gctttaccat ggagtaatga gctt

24

<210> 41

<211> 1367

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic nucleotide construct

<400> 41

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gtatgtatgt atgtatgcta tatacagatc gataaagttg atcgttttca ttttcgacaa 60
atacaaacct cgtgagagaa tcttctcgat catatggcac gagcaggacc actaaccccta 120
acttcgctag cgctcgagaa atcgctgcat gaaaagttta taaggagcga agacgagagg 180
cctaacttag catacgaatc atttagcagt cagattccat tgatctctct ctctgggatc 240
gacgatgaat gtaataagag gaaagagctg tgcaagagaa tagcgagcgc atgcgaagat 300
tgggggtatt ttcaagtgat cgatcatggg atcgatttga aactcgtaaa cgatatgact 360
cgtttggttc gtgagttctt cgatttgccc gacgaagaga agctgaggtt cgatatgtct 420
ggtgggagaa aaggagggtt cattgtttcg agccaccttc agggcgaggt ggtccaagac 480
tggcgcgaga tcgtgacctt cttcacatac cctatcaaag gccgtgacta ttccctgtgg 540
cccgacaagc ccgaggcatg gcgggccgtg acagagacct acagctcgca gctaattgtg 600
ctgggctgca aattgctagg aatcctatcc gaggcaatgg gcctcgaaa agaaagcgtg 660
accaaggcct gtctgaacat ggacccaaaa gttgtggtca acttttaccc aaaatgccct 720
cagcccaatt tgacattggg cctgaagagg cactcggacc caggtttgat cactctgctg 780
tttcaggata acgttggcgg gcttcaagcg actcgagacg gcgggaagtc gtggatcacg 840
gtccagcccg ttgagggtgc attcgtggtc aatcttggtg attttgctca ttacttgagc 900
aatggaaggt tcaagaacgc ggatcatcga gcggtggtga attcaaacac gaatagaatg 960
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atggctaaag acattgaact tgccaagctc aagaagctag ccaaggaaca aaagttgcaa 1140
gaagaagttg ttaataatgt tgaagatcat catcttaaca atgggaaaac taaataggag 1200
gttaaggtct ttaaggaaac tgacgttgct ttgtgattgt tatatattct ctatgtcgta 1260
ttcgtcttaa ggttgtcaga tgaaaatc gaccatgtta ggtatttaat ttatatgaat 1320
tgtattgcct agtcggccat attatgatta aaaaaaaaaa aaaaaaa 1367

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<210> 42
 <211> 22
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 42
 ttctctgtcg acgcccattg cc 22

<210> 43
 <211> 22
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 43
 cgccgtgtcg actcgcttga ag 22

<210> 44
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 44
 aattatttcc caatgttcaa aaat 24

<210> 45
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 45
 tggagcttta ggtttgtgaa a 21

<210> 46
 <211> 23
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 46

atgggagaag aatacaagaa aac

23

<210> 47

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 47

tcttacgata aaacaaactc a

21

<210> 48

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 48

atcatcgagc ggtggtgaa

19

<210> 49

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 49

tggccgacta ggcaatacaa t

21

<210> 50

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 50

cccttctgtt tggtgaaaag cc

22

<210> 51
 <211> 22
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 51
 cctcggattc ctccttgata gc

22

<210> 52
 <211> 29
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 52
 cccatatata gccatggaag ataccatcg

29

<210> 53
 <211> 26
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 53
 tagtggtgtg gagtcggggg atttcg

26

<210> 54
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 primer

<400> 54
 aatgggatgc ttccgacttc t

21

<210> 55
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 55

cagtggtttc tgccattgct t

21

<210> 56

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic probe

<400> 56

aggaaaaaac aggctgaaaa

20

<210> 57

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 57

catcgagcgg tggatgaatt

19

<210> 58

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 58

ctggcgatgg gttttgaaa

19

<210> 59

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic probe

<400> 59
 aaacacgaat agaatgtcg 19

<210> 60
 <211> 22
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

<400> 60
 gaagatgacc ttgcggtgat tt 22

<210> 61
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

<400> 61
 ttgtcctctt cccctttata ggttt 25

<210> 62
 <211> 26
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic probe

<400> 62
 agttcgccgg gagtttcgtg agtctg 26

<210> 63
 <211> 17
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

<400> 63
 ggttggcccg catttca 17

<210> 64
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 64
tagaaaaccc tccggcagaa

20

<210> 65
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
probe

<400> 65
agatggactt aaatgcg

17

<210> 66
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 66
gcattgagca agacgtttgt g

21

<210> 67
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 67
acgggaactg taacccatt c

21

<210> 68
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic probe

<400> 68

agcttgtgtc gtggtacg

18

<210> 69

<211> 2220

<212> DNA

<213> *Linaria bipartita*

<220>

<221> CDS

<222> (127)..(1488)

<400> 69

tggacactga catggactga aggagtagaa ataccaaaag ttttcaaact ctttattgca 60

atatacttgt acaaatctac tgcaactaaa acctattatt aattatatat ataccatata 120

atagat atg gaa gat acc atc gta ttt tac act cca agc gat cac agt 168

Met Glu Asp Thr Ile Val Phe Tyr Thr Pro Ser Asp His Ser

1

5

10

caa ccc aca ata gcg ttg gca aag ttc atc agc aaa cac cac cct tcc 216

Gln Pro Thr Ile Ala Leu Ala Lys Phe Ile Ser Lys His His Pro Ser

15

20

25

30

atc tcc atg aca atc atc agc acc gcc gca ttc cct tcg tcc gca gcg 264

Ile Ser Met Thr Ile Ile Ser Thr Ala Ala Phe Pro Ser Ser Ala Ala

35

40

45

gtg ctg cct aaa aca ata agt tac cac ccc ctc ccc gcc gtg ccc atg 312

Val Leu Pro Lys Thr Ile Ser Tyr His Pro Leu Pro Ala Val Pro Met

50

55

60

ccc ccg aac ctc tcc tcc aat ccc gtg gaa ttc ctc ttc gaa atc ccc 360

Pro Pro Asn Leu Ser Ser Asn Pro Val Glu Phe Leu Phe Glu Ile Pro

65

70

75

cga ctc cac aac act aaa ctc cgc gaa gca ctc gaa aga atc tcc gag 408

Arg Leu His Asn Thr Lys Leu Arg Glu Ala Leu Glu Arg Ile Ser Glu

80

85

90

aca tca aag atc aag gcg ttg gtt atc gat ttc ttt tgc aac tcc gct 456

Thr Ser Lys Ile Lys Ala Leu Val Ile Asp Phe Phe Cys Asn Ser Ala

95

100

105

110

ttc gaa gtt tcc agg agc ttg aac att ccg aca ttc ttc gaa gcc agc 504

Phe Glu Val Ser Arg Ser Leu Asn Ile Pro Thr Phe Phe Glu Ala Ser

115

120

125

ctc ggc gcg tcc ggg ctc tgc gag ttt ctc tac cac ccg aca ttt cac 552

Leu Gly Ala Ser Gly Leu Cys Glu Phe Leu Tyr His Pro Thr Phe His

130

135

140

aaa acc gtc ccc gga gac atc gcg gac ttc aac gac ttt ctt gaa atc	600
Lys Thr Val Pro Gly Asp Ile Ala Asp Phe Asn Asp Phe Leu Glu Ile	
145 150 155	
ccg ggg tgc cct ccg ctt cac tcg gct gat gtc cct aag ggt ttg ttc	648
Pro Gly Cys Pro Pro Leu His Ser Ala Asp Val Pro Lys Gly Leu Phe	
160 165 170	
cga cgc aag act att gct tac aaa cac ttc ctc gac act gcc aac aac	696
Arg Arg Lys Thr Ile Ala Tyr Lys His Phe Leu Asp Thr Ala Asn Asn	
175 180 185 190	
atg cgg atg tcg agt gga atc ctc tta cac gcg ttc gat gcg ctt gaa	744
Met Arg Met Ser Ser Gly Ile Leu Leu His Ala Phe Asp Ala Leu Glu	
195 200 205	
tac cga gct aag gaa gct ttg tcc aac ggc ttg tgc aat ccg gac ggg	792
Tyr Arg Ala Lys Glu Ala Leu Ser Asn Gly Leu Cys Asn Pro Asp Gly	
210 215 220	
cca act ccg cct gtt tac ttt gtt tcg cct act gtg gct gaa aca ttg	840
Pro Thr Pro Pro Val Tyr Phe Val Ser Pro Thr Val Ala Glu Thr Leu	
225 230 235	
gca tac agg gaa aac acc gcc gcc ttg cgg cat gaa tgc ttg acg tgg	888
Ala Tyr Arg Glu Asn Thr Ala Ala Leu Arg His Glu Cys Leu Thr Trp	
240 245 250	
ctt gat ttg cag cct gat aaa agc gtt atc ttc ctt tgt ttt gga agg	936
Leu Asp Leu Gln Pro Asp Lys Ser Val Ile Phe Leu Cys Phe Gly Arg	
255 260 265 270	
agg gga aca ttc tcc atg caa cag ttg cat gaa att gct gtc ggt ctt	984
Arg Gly Thr Phe Ser Met Gln Gln Leu His Glu Ile Ala Val Gly Leu	
275 280 285	
gaa cgg agc ggg cga aga ttt ctc tgg gcc atc cgc agt agt ggg gca	1032
Glu Arg Ser Gly Arg Arg Phe Leu Trp Ala Ile Arg Ser Ser Gly Ala	
290 295 300	
ggg aac ggt gag cct gac ttg agc gtg gtg ctg ccg gag ggt ttc ttg	1080
Gly Asn Gly Glu Pro Asp Leu Ser Val Val Leu Pro Glu Gly Phe Leu	
305 310 315	
gag aga acc aaa gat att ggg ctg gtg ata acg aca tgg gcg ccg cag	1128
Glu Arg Thr Lys Asp Ile Gly Leu Val Ile Thr Thr Trp Ala Pro Gln	
320 325 330	
aaa gag gtg tta agc cat gtg gcc gtg tgt gga ttt gtg acg cac tgc	1176
Lys Glu Val Leu Ser His Val Ala Val Cys Gly Phe Val Thr His Cys	
335 340 345 350	
ggc tgg aac tca gtt ctc gag gcg gtg tcg ttt ggg gtt ccg atg att	1224
Gly Trp Asn Ser Val Leu Glu Ala Val Ser Phe Gly Val Pro Met Ile	
355 360 365	

ggg tgg ccg ctg tac gca gag cag agg atg aat cgg gtg ttt atg gtg 1272
Gly Trp Pro Leu Tyr Ala Glu Gln Arg Met Asn Arg Val Phe Met Val
370 375 380

gag gaa ata aag gtg gca ttg cct ttg gag gag gag gcg gat ggg ttg 1320
Glu Glu Ile Lys Val Ala Leu Pro Leu Glu Glu Glu Ala Asp Gly Leu
385 390 395

gtg agg gcg aca gaa ttg gag aag cgg gtg aga gag ttg acc gag tcc 1368
Val Arg Ala Thr Glu Leu Glu Lys Arg Val Arg Glu Leu Thr Glu Ser
400 405 410

gtg agg gga aaa gcg gta agc cgg cgg gtg gag gaa atg aga ctc tcg 1416
Val Arg Gly Lys Ala Val Ser Arg Arg Val Glu Glu Met Arg Leu Ser
415 420 425 430

gca gag aag gcc gtg agc aag ggt gga acg tcg ctg att gca ttg gag 1464
Ala Glu Lys Ala Val Ser Lys Gly Gly Thr Ser Leu Ile Ala Leu Glu
435 440 445

aaa ttc atg gac tcg att act cta taagcgtaag agttgctata aatttagcta 1518
Lys Phe Met Asp Ser Ile Thr Leu
450

tgttgcacgg atacgtcaaa taaaccttgc tcgtattctt agatacgtat actatacaaa 1578

tacaatttat gaataagttt ttcatatggc gtatgaagta ttctaattaa attaaataac 1638

acgtttttgaa gcgttattat aaagggcgtaa ctagtaaata ataagaaata attaaacaaa 1698

aaaaaattat gatgttaatg ataattttat taatatTTTA tactataaag ttcttaatat 1758

tcttgttgat atgtaagttt attatataag tatttttaagt gttttatttg gtattttgaa 1818

tttaagtacc atcgtggaat actttttatat gagcttataa ttttaatggt gaatagattt 1878

catattaata tgttattatt tatgtgaaca aaaaatatta ttgctcaagt tattttgaat 1938

tataattttta tatatataag tatttgatat aaaatatatta acgtattatg tgcgtatcct 1998

tattttacaa agttacccgt attcgtttca tgtttgatac attttttcat attcgtatat 2058

gtgcccgtgt ccgtgcaata tagtaaatta gttatggtat gtgatgtttc tatgttgtaa 2118

caaaataatg gtacttaatt tgaatagtc agtcaagtat ttgtaatgtt aaattaatat 2178

tccatttaat attccattat tctctcaaaa aaaaaaaaaa aa 2220

<210> 70

<211> 454

<212> PRT

<213> Linaria bipartita

<400> 70

Met Glu Asp Thr Ile Val Phe Tyr Thr Pro Ser Asp His Ser Gln Pro
1 5 10 15

Thr	Ile	Ala	Leu	Ala	Lys	Phe	Ile	Ser	Lys	His	His	Pro	Ser	Ile	Ser		
			20					25					30				
Met	Thr	Ile	Ile	Ser	Thr	Ala	Ala	Phe	Pro	Ser	Ser	Ala	Ala	Val	Leu		
		35					40					45					
Pro	Lys	Thr	Ile	Ser	Tyr	His	Pro	Leu	Pro	Ala	Val	Pro	Met	Pro	Pro		
		50				55					60						
Asn	Leu	Ser	Ser	Asn	Pro	Val	Glu	Phe	Leu	Phe	Glu	Ile	Pro	Arg	Leu		
	65				70					75					80		
His	Asn	Thr	Lys	Leu	Arg	Glu	Ala	Leu	Glu	Arg	Ile	Ser	Glu	Thr	Ser		
				85					90					95			
Lys	Ile	Lys	Ala	Leu	Val	Ile	Asp	Phe	Phe	Cys	Asn	Ser	Ala	Phe	Glu		
			100					105					110				
Val	Ser	Arg	Ser	Leu	Asn	Ile	Pro	Thr	Phe	Phe	Glu	Ala	Ser	Leu	Gly		
		115					120					125					
Ala	Ser	Gly	Leu	Cys	Glu	Phe	Leu	Tyr	His	Pro	Thr	Phe	His	Lys	Thr		
		130				135						140					
Val	Pro	Gly	Asp	Ile	Ala	Asp	Phe	Asn	Asp	Phe	Leu	Glu	Ile	Pro	Gly		
	145				150					155					160		
Cys	Pro	Pro	Leu	His	Ser	Ala	Asp	Val	Pro	Lys	Gly	Leu	Phe	Arg	Arg		
				165					170					175			
Lys	Thr	Ile	Ala	Tyr	Lys	His	Phe	Leu	Asp	Thr	Ala	Asn	Asn	Met	Arg		
			180					185					190				
Met	Ser	Ser	Gly	Ile	Leu	Leu	His	Ala	Phe	Asp	Ala	Leu	Glu	Tyr	Arg		
		195					200					205					
Ala	Lys	Glu	Ala	Leu	Ser	Asn	Gly	Leu	Cys	Asn	Pro	Asp	Gly	Pro	Thr		
		210				215					220						
Pro	Pro	Val	Tyr	Phe	Val	Ser	Pro	Thr	Val	Ala	Glu	Thr	Leu	Ala	Tyr		
	225				230					235					240		
Arg	Glu	Asn	Thr	Ala	Ala	Leu	Arg	His	Glu	Cys	Leu	Thr	Trp	Leu	Asp		
				245					250					255			
Leu	Gln	Pro	Asp	Lys	Ser	Val	Ile	Phe	Leu	Cys	Phe	Gly	Arg	Arg	Gly		
			260					265					270				
Thr	Phe	Ser	Met	Gln	Gln	Leu	His	Glu	Ile	Ala	Val	Gly	Leu	Glu	Arg		
		275					280					285					
Ser	Gly	Arg	Arg	Phe	Leu	Trp	Ala	Ile	Arg	Ser	Ser	Gly	Ala	Gly	Asn		
	290					295					300						
Gly	Glu	Pro	Asp	Leu	Ser	Val	Val	Leu	Pro	Glu	Gly	Phe	Leu	Glu	Arg		
	305				310					315					320		

[illegible]